WHAT IS CLAIMED IS:

1. A manufacturing method of a semiconductor device, comprising the steps of:

making a device using nitride III-V compound semiconductors on one major surface of a single-crystal substrate made of a material different from nitride III-V compound semiconductors;

thinning said single-crystal substrate by processing the other major surface of said single-crystal substrate by lapping using an abrasive liquid containing an abrasive material of diamond abrasive grains and reducing the grain size of said abrasive material in plural steps; and

removing a strained layer produced on said other major surface of said single-crystal substrate during said lapping by etching said other major surface of said single-crystal substrate after lapping by using an etchant containing phosphoric acid or phosphoric acid and sulfuric acid as its major component and heated to 150 through 450 °C.

2. The manufacturing method of a semiconductor device according to claim 1 wherein said single-crystal substrate is thinned to a thickness not larger than 100 μm.

3. The manufacturing method of a semiconductor device according to claim 1 wherein the surface of said device made on said one major surface of said single-

crystal substrate is covered by a protective film having a resistance to said etchant before said other major surface of said single-crystal substrate is etched.

4. The manufacturing method of a semiconductor device according to claim 3 wherein said protective film is a silicon oxide film, silicon nitride film or polyimide film.

5. The manufacturing method of a semiconductor device according to claim 1 wherein said other major surface of said single-crystal substrate is etched by immersing only said other major surface of said single-crystal substrate into said etchant.

6. The manufacturing method of a semiconductor device according to claim 1 wherein said single-crystal substrate is a sapphire substrate, spinel substrate, perovskite yttrium aluminate substrate or SiC substrate.

7. The manufacturing method of a semiconductor device according to claim 1 wherein said semiconductor device is a semiconductor laser using nitride III-V compound semiconductors.

8. The manufacturing method of a semiconductor device according to claim 1 wherein said semiconductor device is a FET using nitride III-V compound semiconductors.

9. A semiconductor device having a single-

crystal substrate made of a material different from nitride III-V compound semiconductors, and a device made on one major surface of said single-crystal substrate by using III-V compound semiconductors, comprising:

electrical connection to said device being made through a via hole formed in said single-crystal substrate.

10. The semiconductor device according to claim 9 wherein said single-crystal substrate is a sapphire substrate, spinel substrate, perovskite yttrium aluminate substrate or SiC substrate.

11. The semiconductor device according to claim 9 wherein said semiconductor device is a semiconductor laser using nitride III-V compound semiconductors.

12. The semiconductor device according to claim 9 wherein said semiconductor device is a FET using nitride III-V compound semiconductors.

13. A manufacturing method of a semiconductor device having a single-crystal substrate made of a material different from nitride III-V compound semiconductors and a device made on one major surface of said single-crystal substrate by using III-V compound semiconductors, in which electrical connection to said device is made through a via hole formed in said single-crystal substrate, comprising the step of:

forming said via hole by selectively etching

the other major surface of said single-crystal substrate by using an etchant containing as its major component phosphoric acid or phosphoric acid and sulfuric acid heated to 150 through 450 °C.

14. The manufacturing method of a semiconductor device according to claim 13 wherein an etching mask made of a first thin film of Cr, Ti or Ni and a second thin film of Pt, Pd or Au thereon is made on said other major surface of said single-crystal substrate, and said via hole is made by etching said other major surface of the single-crystal substrate using said etching mask.

15. The manufacturing method of a semiconductor device according to claim 13 wherein said other major surface of said single-crystal substrate is etched by immersing only said other major surface of said single-crystal substrate into said etchant.

16. The manufacturing method of a semiconductor device according to claim 13 wherein said single-crystal substrate is a sapphire substrate, spinel substrate, perovskite yttrium aluminate substrate or SiC substrate. 17. The manufacturing method of a semiconductor device according to claim 13 wherein said semiconductor device is a semiconductor laser using nitride III-V compound semiconductors.

18. The manufacturing method of a semiconductor device according to claim 13 wherein said semiconductor

device is a FET using nitride III-V compound semiconductors.

19. A manufacturing method of a semiconductor device having a single-crystal substrate made of a material different from nitride III-V compound semiconductors and a device made on one major surface of said single-crystal substrate by using III-V compound semiconductors, in which electrical connection to said device is made through a via hole formed in said single-crystal substrate, comprising the steps of:

making a hole as deep as 10 μm or more but not reaching said one major surface of said substrate by selectively irradiating laser light having a wavelength not shorter than 6 μm onto the other major surface of said single-crystal substrate; and

making said via hole by etching said other major surface of said single-crystal substrate by using an etchant containing as its major component phosphoric acid or phosphoric acid and sulfuric acid heated to 150 through 450 °C so as to make said hole reach said one major surface.

20. The manufacturing method of a semiconductor device according to claim 19 wherein pulse laser light having the wavelength of 10.6 μm from a CO_2 laser is used as said laser light.

21. The manufacturing method of a semiconductor device according to claim 19 wherein said single-

crystal substrate is a sapphire substrate, spinel substrate, perovskite yttrium aluminate substrate or SiC substrate. 22. The manufacturing method of a semiconductor device according to claim 19 wherein said semiconductor device is a semiconductor laser using nitride III-V compound semiconductors.

23. The manufacturing method of a semiconductor device according to claim 19 wherein said semiconductor device is a FET using nitride III-V compound semiconductors.